

in them. And here I shall endeavour to shew by what composition all kind of compound colours are made, and how there is no colour in the world but may be made from the various degrees of these two colours, together with the intermixtures of *Black* and *White*.

And this being so, as I shall anon shew, it seems an evident argument to me, that all colours whatsoever, whether in fluid or solid, whether in very transparent or seemingly *opacous*, have the same efficient cause, to wit, some kind of *refraction* whereby the Rays that proceed from such bodies, have their pulse *obliquated* or *confus'd* in the manner I explicated in the former *Section*; that is, a *Red* is caus'd by a duplicated or *confus'd* pulse, whose strongest pulse precedes, and a weaker follows: and a *Blue* is caus'd by a *confus'd* pulse, where the weaker pulse precedes, and the stronger follows. And according as these are, more or less, or variously mixt and compounded, so are the *sensations*, and consequently the *phantasms* of colours *diversified*.

To proceed therefore; I suppose, that all transparent colour'd bodies, whether fluid or solid, do consist at least of two parts, or two kinds of substances, the one of a substance of a somewhat differing *refraction* from the other. That one of these substances which may be call'd the *tinging* substance, does consist of distinct parts, or particles of a determinate bigness which are *disseminated*, or dispers'd all over the other: That these particles, if the body be equally and uniformly colour'd, are evenly rang'd and dispers'd over the other contiguous body; That where the body is deepest ting'd, there these particles are rang'd thickest; and where 'tis but faintly ting'd, they are rang'd much thinner, but uniformly. That by the mixture of another body that unites with either of these, which has a differing *refraction* from either of the other, quite differing effects will be produc'd, that is, the *consecutions* of the *confus'd* pulses will be much of another kind, and consequently produce other *sensations* and *phantasms* of colours, and from a *Red* may turn to a *Blue*, or from a *Blue* to a *Red*, &c.

Now, that this may be the better understood, I shall endeavour to explain my meaning a little more sensible by a *Scheme*: Suppose we therefore in the seventh *Figure* of the sixth *Scheme*, that A B C D represents a Vessel holding a ting'd liquor, let I I I I, &c. be the clear liquor, and let the tinging body that is mixt with it be E E, &c. F F, &c. G G, &c. H H, &c. whose particles (whether round, or some other determinate Figure is little to our purpose) are first of a determinate and equal bulk. Next, they are rang'd into the form of *Quincunx*, or *Equilaterotriangular* order, which that probably they are so, and why they are so, I shall elsewhere endeavour to shew. Thirdly, they are of such a nature, as does either more easily or more difficultly transmit the Rays of light than the liquor; if more easily, a *Blue* is generated, and if more difficultly, a *Red* or *Scarlet*.

And first, let us suppose the tinging particles to be of a substance that does more *impede* the Rays of light, we shall find that the pulse or wave of light mov'd from A D to B C, will proceed on, through the containing *medium* by the pulses or waves K K, L L, M M, N N, O O; but

because

because several of these Rays that go to the constitution of these pulses will be slugged or stopped by the tinging particles E, F, G, H; therefore there shall be a *secondary* and weak pulse that shall follow the Ray, namely P P which will be the weaker: first, because it has suffer'd many *refractions* in the impeding body; next, for that the Rays will be a little dispers'd or *confus'd* by reason of the *refraction* in each of the particles, whether *round* or *angular*; and this will be more evident, if we a little more closely examine any one particular tinging *Globule*.

Suppose we therefore A B in the eighth *Figure* of the sixth *Scheme*, to represent a tinging *Globule* or particle which has a greater *refraction* than the liquor in which it is contain'd: Let C D be a part of the pulse of light which is *propagated* through the containing *medium*; this pulse will be a little stopt or impeded by the *Globule*, and so by that time the pulse is past to E F that part of it which has been impeded by passing through the *Globule*, will get but to L M, and so that pulse which has been *propagated* through the *Globule*, to wit, L M, N O, P Q, will always come behind the pulses E F, G H, I K, &c.

Next, by reason of the greater impediment in A B, and its *Globular* Figure, the Rays that pass through it will be dispers'd, and very much scatter'd. Whence C A and D B which before went *direct* and *parallel*, will after the *refraction* in A B, *diverge* and spread by A P, and B Q; so that as the Rays do meet with more and more of these tinging particles in their way, by so much the more will the pulse of light further lag behind the clearer pulse, or that which has fewer *refractions*, and thence the deeper will the colour be, and the fainter the light that is trajected through it; for not onely many Rays are reflected from the surfaces of A B, but those Rays that get through it are very much disordered.

By this *Hypothesis* there is no one experiment of colour that I have yet met with, but may be, I conceive, very rationally solv'd, and perhaps, had I time to examine several particulars requisite to the demonstration of it, I might prove it more than probable, for all the experiments about the changes and mixings of colours related in the *Treatise of Colours*, published by the *Incomparable* Mr. Boyle, and multitudes of others which I have observ'd, do so easily and naturally flow from those principles, that I am very apt to think it probable, that they own their production to no other *secondary* cause: As to instance in two or three experiments. In the twentieth Experiment, this *Noble Authour* has shewn that the deep *bluish purple-colour* of *Violets*, may be turn'd into a *Green*, by *Alcalizate Salts*, and to a *Red* by *acid*; that is, a *Purple* consists of two colours, a deep *Red*, and a deep *Blue*; when the *Blue* is diluted, or altered, or destroy'd by *acid Salts*, the *Red* becomes predominant, but when the *Red* is diluted by *Alcalizate*, and the *Blue* heightned, there is generated a *Green*; for of a *Red* diluted, is made a *Yellow*, and *Yellow* and *Blue* make a *Green*.

Now, because the *spurious* pulses which cause a *Red* and a *Blue*, do the one follow the clear pulse, and the other precede it, it usually follows, that those *saline* refracting bodies which do *dilute* the colour of the one, do deepen that of the other. And this will be made manifest by almost